



Natural Heritage &  
Endangered Species  
Program

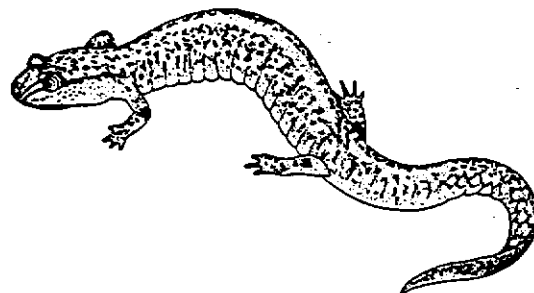
Commonwealth of Massachusetts  
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MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Northern Spring Salamander  
(*Gyrinophilus p. porphyriticus*)

**ETYMOLOGY:** *Gyrinophilus* is Greek, meaning "a lover of the tadpole stage." The Northern Spring Salamander is an *amphibian*, coming from the Greek *amphi*, for "two" or "double," plus *bios*, for "life." An amphibian, then, is a vertebrate animal that leads two lives.

**DESCRIPTION:** The Northern Spring Salamander, sometimes called "Purple Salamander," is the largest of our lungless salamanders in New England. The adult length is 12-19 cm (5-8 in.) with the females slightly smaller than the males. The ground color of the skin is yellowish-brown with reddish or salmon tinges and darker net-like mottling on the sides, back, and tail. With age the ground color darkens and the mottling becomes more distinct. A light line bordered with gray begins at the eye and curves down over the nose and through the nostril. The tail has a prominent, knife-like keel on the top which aids this aquatic species in swimming and gas exchange. Costal grooves are conspicuous, with most individuals having 17. The underside is flesh-colored except where the liver, showing through the transparent skin, imparts a bluish cast. The tips of the toes and the knee and elbow joints are sometimes conspicuously darker than the rest of the legs.

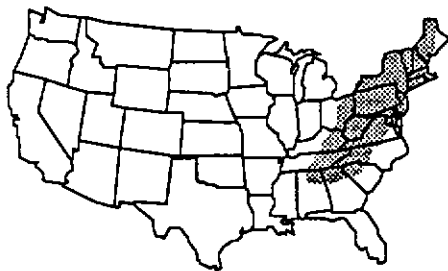


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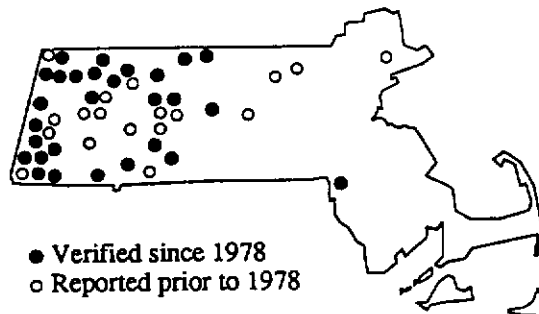
The body of the gyros (as it is commonly called) is long and slender yet strong and well proportioned. The head in front tapers slightly to a bluntly truncated snout. The legs are stout with slightly webbed toes at the base.

Sexual differences are not strongly marked externally but the males average somewhat longer than the females. When the females are carrying well-developed eggs, they are visible through the skin of the belly. Larvae are 2.6-2.8 cm (1 in) long when first hatched and are tadpole-like, pale and flesh colored. They are colored with a gray net-like pattern, have large tailfins, and external, plume-like gills, generally red in color.

**SIMILAR SPECIES IN MASSACHUSETTS:** The Northern Dusky Salamander (*Desmognathus fuscus fuscus*), found in similar habitats, is smaller and darker than the Northern Spring Salamander.



Range of the Northern Spring Salamander



● Verified since 1978  
○ Reported prior to 1978

Distribution in Massachusetts

**RANGE:** The Northern Spring Salamander occurs in uplands from western Maine and southern Quebec and Ontario, western Massachusetts, New Hampshire and Vermont, through the Appalachian Mountains and foothills, south to Pennsylvania and northern New Jersey, through Georgia and Alabama, and southwest into eastern Ohio and extreme northeastern Mississippi. This species is absent from the Atlantic coastal plain. In Massachusetts, this species is confined to the uplands in the western two-thirds of the state: the Berkshires, Connecticut River Valley, and Worcester County highlands of Mount Wachusett and Lunenburg.

**HABITAT IN MASSACHUSETTS:** The most important elements in the habitat of the Northern Spring Salamander are clear, cold, alkaline or slightly acidic waters of springs, streams and lakes, and logs or stones under which to hide. It will not survive in warm or muddy waters or in streams that have been polluted by commercial wastes. This species is typically found in undisturbed, high-relief mountain streams, but also in less steep, cool seeps and springs in forested areas. During the winter, the gyros will remain in wet, unfrozen substrate or burrows near, in, or under brooks, where they may remain active all winter.

Its association with cool, well-oxygenated habitat may be related to its anatomy. The Northern Spring Salamander has no lungs; its oxygen needs are met by absorbing oxygen through its moist skin and the membranes in its throat. This species is restricted to only those streams with an ample oxygen supply.

**LIFECYCLE/BEHAVIOR:** Mating takes place in the fall, with egg-laying in the spring and summer. During courtship, the male and female engage in an amorous pushing match accompanied by much rolling around in the water. The male deposits a spermatophore which is picked up by the female and stored in her cloaca until eggs are laid. Eggs are cemented one at a time under a stone, or sometimes a log, in running water. The female, while upside down in the water under a stone, presses her cloaca against the stone and extrudes the egg, which adheres where it is pressed. The resulting compact cluster may contain anywhere from 10–160 eggs, but 40–60 is most typical. The female guards the eggs until they hatch in late summer or early fall. Young may remain nearby for several months after hatching.

The aquatic larval period is variable but averages four years. The larvae are 10–13 cm (4–5 in) long at metamorphosis or transformation, which occurs in late spring and summer. At this time, the pattern and colors are practically those of the adult but lighter, and with clouded markings. Sexual maturity is attained at a length of approximately 14 cm (6 in) or at 4 or 5 years of age.

The adult Northern Spring Salamander hides by day beneath stones, logs and old water-soaked boards or among the roots and stones imbedded in the banks and bottoms of streams and springs. Only under the stress of breeding season are they found out and about during the day. The larvae are entirely aquatic. The smaller ones are more diurnal (daytime) in their habits and may sometimes be seen moving about among the stones on stream bottoms. Larger larvae, like the adults, seek the protection of bottom debris, of stones and stranded logs. Occasionally a specimen is found on land a considerable distance from water, and at night the adults are given to wandering about sometimes from one stream or spring to another.

Both larvae and adults are extremely active if disturbed and seek to escape by swimming and burrowing. When grasped roughly, they wriggle violently and, aided by their secretion of slime, often make their escape. When swimming freely in open water, the body is thrown into eel-like lateral undulations with the legs held closely to the sides. The Northern Spring Salamander also exhibits another self-defense behavior: biting. It snaps fiercely, but harmlessly, and throws its body into contortions "in terrorem".

During the colder months, the adults bury themselves beneath stones or logs in the streams or springs and spend the winter below the surface. In summer when the streams are low they again bury themselves deeply either in or out of water but always in situations that are constantly moist. Northern Spring Salamanders prey upon virtually any small animal that they can subdue and ingest, including aquatic insects and their nymph and larval forms, terrestrial insects, crustaceans, centipedes, earthworms, snails, spiders, millipedes, small frogs, and other salamanders. Adults forage for food among rocks and vegetation in or along stream beds on rainy summer evenings. Larvae are also generalist feeders, preying principally on small aquatic invertebrates.

**POPULATION STATUS IN MASSACHUSETTS:** The Northern Spring Salamander is generally uncommon throughout most of its range in Massachusetts, and is classified as a "Species of Special Concern" in the state.

Historically or prior to 1978, there were 18 sightings or "populations" reported in 18 different locations in the western part of the state. Since 1978, there have been 37 sightings or "populations" reported and verified to the Massachusetts Natural Heritage and Endangered Species Program from 28 different western Massachusetts locations.

**MANAGEMENT RECOMMENDATIONS:** The principal threat to this sensitive species is degradation of its cold water habitats. Pollution in the form of road and agricultural run-off and siltation from construction and logging must be strongly discouraged if this species is to be maintained. Avoid erosion into streams that would bury rocks, logs, etc. that provide cover. Avoid use of rip-rap along streambanks that would eliminate cover and burrowing habitat for winter or dry periods. Water tables—and particularly the groundwater flows that result in springs—must be scrupulously guarded against alteration, as the species often survives the warmest periods of the year (when some streams become too warm to support it) by retreating into spring seeps along the edges of main streams. All known habitats should be provided with a 100-foot minimum no-cut buffer zone if timber harvesting is proposed in the area, because if trees and underbrush are cleared, the increased sunlight may cause thermal pollution that may reduce local populations.

Finally, further effort must be made to encourage citizens to identify and report sightings of this animal so that all populations are located. As several populations are known to live within "spring houses" (used in prior centuries to keep perishables in cold storage), farmers, country landowners, and historical societies should be made aware of the possible occurrence of this species in such habitats. The preservation of spring houses inhabited by this species should be encouraged.

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